LUMINARY Memo #61

To: Distribution
From: C. Schulenberg
Date: 14 January 1969
Subject: LUMINARY Revisions 65-69

Major Changes Incorporated into Revision 66

Note: Revision 65 was made solely to correct cusses in Revision 64.

1) The corrections made to the data incorporation scaling logic of R12 in Revision 63 were found to be wrong and this coding was fixed.

2) PCR 265 was implemented (Downlink LR Data).

3) A restartability gap was fixed in P63. Formerly P63 would "die" if a restart occurred between the PROCEED response to the flashing V06N61 and the completion of the R60 maneuver.

4) The computation of the vertical rise ball angles was removed from the mainline ascent guidance equations (where it was being done every 2 seconds during P12, P70 and P71 powered flight) and put in the P12 preburn computations where it will be executed only once. This was done to help alleviate the execution time problem that has plagued P12, P70 and P71.

5) The PINBALL routine was modified so that nouns 70 and 71 would be 1-component nouns.

Major Changes Incorporated into Revision 67

1) PCR 259 was implemented (Omit Zone 1 from Descent Logic).

2) The Radar-Read routine was modified to check the LRBYPASS flag in addition to the R04FLAG. With this change the 521 Alarm (could not read radar) will be skipped if either the R04FLAG is set or the LRBYPASS flag is clear.

3) The setting of R04FLAG was deleted from P63 in connection with the above change.

4) The restart program logic that checks for the oscillator-fail and the LGC warning inbits was removed. Formerly a fresh start would have resulted if either of these inbits had been found set at the time of a hardware restart.

5) R31 was modified so that if the LM is on the surface the CSM state vector is obtained by means of a delta-conic rather than a delta-precision integration.

6) Nouns 70 and 71 were changed back to 3-component nouns.

7) The extended verbs V40N72, V41N72 and V60 were modified to call the subroutine RDRUSECK instead of merely checking RADCADR for the purpose of determining whether or not the extended verb is being called at a legal time. RDRUSECK, which was originally created for use by R04 and R77, will light the operator error light and exit if any of the following conditions are met: R29 operating, R77 operating, R12 operating, P20 operating, or P22 operating.

8) PCR 640 was implemented (Remove the instabilities and excessive overshoots from the RR designate routine, R21).

Major Changes Incorporated into Revision 68

1) PCR 264 was implemented (Add TALIGN to Coast and Align downlink list).

2) Restart protection was incorporated into P57.

3) An error was corrected in the Ascent-Descent list. DNRRANGE was being used instead of RM in word 9.

4) Fixes were made to the coding introduced into the R21 area in the previous revision (PCR 640).

5) The setting of APSFLAG by P71 was moved to be prior to the initial software restart so that the DAP would be in the Ascent configuration when it resumed following the re-initialization.

6) A change was made to P40 and P42 so that FINDCDUW will continue to be called by S40.8 even if the alarm code 1407 is issued.

7) A program error was corrected in the Mass Monitor routine that had the effect of randomly creating an initial mass error in P12.

8) PCR 639 was implemented (Altitude Reasonability Test Parameters in Erasable Memory). This required the new padload DELQFIX.

9) A change was made to the AOTMARK routine to insure that MARKRUPT is disabled whenever the V01N71 is displayed.

Major Changes Incorporated into Revision 69

1) P70 was modified so as to command the DPS engine to full throttle both before and after the check on the Auto-throttle discrete. This insures that the DPS will get throttled-up as soon as possible in all instances. The latest revisions of section 4 of the GSOP indicate this additional logic.

2) A program error was corrected in R29. Formerly RADMODES would have been written over with background on one of the R29 return paths to Servicer.

3) A program error was corrected in the radar-read routine. The coding inserted into Revision 67 (item #2) contained the error. The effect was that the 521 alarm would always occur if R12 was operating.

4) Modifications were made to the Orbital Maneuvers downlink list that completed the implementation of PCR 229 (Addition of R77 to LUMINARY). The ECADRs for erasables DNRRANGE and DNRRDOT were moved from word 28 to word 76 (which was spare) and the ECADRs for erasables DNLRVELZ and DNLRALT were inserted at word 28 in the space vacated. The primary reason for this change was to insure that DNLRALT (updated by R77) appears on the downlink once per second.